

Archaeology and the Social History of Ships

Richard A. Gould



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1 · Interpreting the Underwater Archaeological Record

For experienced divers, the underwater world is a familiar neighborhood, and its rewards and hazards are as open to human experience as any on land. Although strikingly different from the land environment, it is knowable in the same way. Underwater archaeology is just as amenable to scientific methods and its results are measurable by the same standards as archaeology on land. The issues with regard to acquiring knowledge of the human past through archaeology are equally relevant underwater and on land. Just as land archaeology has had to distance itself from its early connections with tomb-robbers and pothunters, underwater archaeology is progressively disengaging itself from its unfortunate association with treasure hunting. Increasingly, it is characterized by the use of controlled methods of data recovery and by analytical approaches to inferences about past human behavior based on those data.

History and Archaeological Science

Underwater archaeology encompasses a broad range of submerged cultural remains. As a historical science, it is structured by many of the same sorts of assumptions and general principles that guide paleontology, evolutionary biology, and geology. Underwater archaeologists, like their land counterparts, rely heavily upon scientific methods of dating as well as upon controlled laboratory methods for studying ancient diet, technology, and ecology. One of the major questions confronting underwater archaeologists today, however, is the extent to which archaeology should also be viewed as a social science. To what extent should underwater

archaeologists apply and test ideas about the human past based on concepts of culture and society more commonly associated with social sciences than with history? This question is especially significant in the case of shipwrecks that are the products of historically documented situations in the past.

Not everyone agrees on the value of archaeology in studying the human past when documentary evidence is available, and there is even greater disagreement about the relevance of anthropologically based attempts at historical analysis. Some maritime historians and archaeologists argue that is not worthwhile to engage in the archaeology of shipwrecks or related materials later than the eighteenth century, when ships' plans, drawings, and other documents and general written accounts become plentiful for the first time (D. Lyon, personal communication; Muckelroy, 1980a: 10; see also Ballard, 1987: 138). This view categorically rejects the archaeological record as a primary and legitimate source of information about past human behavior whenever written documents are available. Archaeologists often counter that the historical record is inherently biased and incomplete – that it commonly concentrates on the activities of cultural elites and major events at the expense of the everyday behavior of ordinary people, (Glassie, 1966; Deetz, 1977). The rationale that archaeology serves to overcome elitist bias is fine as far as it goes, but it provides a timid and inadequate basis for archaeological scholarship because it assigns primacy to the historical record in setting the archaeological agenda.

A more extreme version of this argument points to the self-serving uses of written histories by various elites to justify their behavior and presents archaeology as a similar form of revisionism (Shanks and Tilley, 1988: 186–208; Trigger, 1990: 370–411). Some archaeologists have proposed that archaeological science has achieved dominance by suppressing or ignoring alternative views of the past. The victims of such dominance include women, various ethnic minorities, and other groups defined by religious beliefs, low economic or social status, and generally marginal relations to mainstream Western-oriented culture. Advocates of this view argue that every cultural, ethnic, or other special-interest group has a unique view of the past that must be understood and appreciated on its own terms and accepted as valid to the same degree as archaeological science. Seen from this point of view, archaeological science is hegemonic – an extension of Western cultural imperialism and should be relegated to

the status of an ethnoscience – no better for understanding the human past than, say, Australian Aboriginal concepts of the “Dreamtime” or modern creationism.

A view that is more widely accepted is rooted in assumptions about the scientifically controlled study of the archaeological record as a valid and compelling source of information about the human past. The archaeological record is an assemblage of material associations that provides circumstantial evidence about past human activities. Like the written record, it is subject to bias, but this bias is mainly of a different order from the biases that affect historical or political interpretations in that it is physical rather than ideological. Archaeologists must first identify and control for the postdepositional factors that can alter the physical associations of archaeological materials. Focusing on those aspects of past human behavior that can be reliably inferred from the archaeological record once relevant postdepositional factors have been identified and controlled means that the results of archaeology and documentary history should be compared as alternative accounts based on different kinds of evidence and assumptions. Employed in this fashion, archaeology serves as a reality check on historically received information and ideas about the past.

Much of contemporary archaeological theory is aimed at recognizing postdepositional processes and measuring their relative effects on the archaeological record. In the case of shipwrecks and submerged terrestrial sites, postdepositional factors such as sedimentation, currents, corrosion, marine growth, and mechanical disturbances due to wave action, ice, earthquakes, and volcanic activity, among others, operate to alter the condition of the deposits. About the only factor of this kind that has been mentioned consistently by maritime archaeologists is the shipworm (or “gribble”) *Teredo navalis* (Robinson, 1981: 12–14), which accounts for the rapid loss of wooden structures and artifacts exposed above the siltline in most saltwater environments. The study of these processes has not always been rigorous, and therefore there is often uncertainty about which material associations were products of human behavior and which due to processes of nature.

The archaeologist Michael Schiffer (1987), for example, distinguishes between the cultural system as it existed while the inhabitants were alive and functioning as a society and the archaeological record, which contains material remains of an extinct cultural system but exists in a domain

governed by the laws of physics, chemistry, geology, and biology even when human activities were present. A comparable approach to underwater site formation processes can be found in the work of the maritime archaeologist Keith Muckelroy (1978), who distinguished between “extracting filters”, which lead to the loss of materials, and “scrambling devices,” which rearrange, mix, or alter them. Among his extracting filters were wrecking, salvage operations, and disintegration of perishable materials; He noted, for example, how elements of wood structure at a shipwreck site may simply float away after wrecking thus removing or “extracting” these items from the archaeological record. Scrambling devices were the disorganizing effects of wrecking and the subsequent rearrangement of materials resulting from seabed movement, currents, marine organisms, storms, and other factors. Interpreting the distribution of shipwreck remains requires attention to the differential effects of these filters and scramblers.

Discovery-Mode Archaeology

Underwater archaeologists, no less than their land counterparts, have a long history of using archaeology to confirm the historicity of documentary accounts and oral traditions. On land such efforts have been identified with archaeological research aimed at demonstrating the historical reality of the Homeric epics (Schliemann’s studies of Troy), the historical validity of the Bible (the Garstang expeditions search in the 1930s for the walls of Old Testament Jericho and Glueck’s search for King Solomon’s mines), the discovery of the “lost city” of the Incas at Macchu Picchu (described by the explorer-archaeologist Hiram Bingham); and the tracing of ancient sea routes of human migration by the ancestors of the Polynesians as represented in oral traditions (especially the studies by the New Zealand anthropologist Peter Buck and the archaeologist Kenneth Emory). Strong elements of this orientation are present in underwater archaeology as well. This tradition of seeking to confirm past events contributes to one of archaeology’s most common pitfalls – the *fallacy of affirming the consequent* assuming the very thing one is trying to find out. The difficulty here is that discoveries made without the benefit of an organized sampling approach tell us nothing about those parts of the region where nothing was discovered. The absence of finds elsewhere may simply mean that potential dis-

coveries were overlooked. These kinds of ambiguities present acute practical difficulties for archaeologists engaged in aerial or underwater surveys, where cost can be an important consideration.

Discovery-mode archaeology has been a dominant feature of shipwreck studies, and it continues to make it hard to evaluate the significance of finds. Without appropriate controls, such discoveries may provide the public with dazzling spectacles but do little to advance our understanding of the past. Major historical events have produced celebrity shipwrecks that attract media attention like iron filings to a magnet. To varying degrees, however, these celebrity ships were atypical for their time and period and by focusing on them archaeologists risk presenting a distorted view of the past. In archaeology as in all historical and scientific scholarship, the first priority is to present as clear a picture as possible of the socio-cultural processes that have produced the patterning observed in the archaeological record. Recently underwater archaeologists have been paying attention to more commonplace ships, often unidentified or anonymous, and to vernacular methods of building and operating ships, and in the process they are becoming increasingly concerned with the issue of sampling and the representativeness of their finds.

Whereas the results of search are difficult to evaluate in relation to the area or domain covered, survey involving probability-based sampling will produce results about the complete archaeological contents of the area or domain. Surveys vary according to local conditions, but they always involve a framework, such as parallel lanes or a grid, in which observations can be made while controlling for factors like visibility, vision (if human observers are used) or sensing parameters (if remote sensing is used), elevation, speed, and other key variables that affect survey coverage. The logic of survey observations is reminiscent of Sherlock Holmes's conclusion about the dog that didn't bark during the night in "Silver Blaze"; it was the anomalous silence of the dog that led to the solution of the mystery. Similarly, the archaeologist should be able to say that, given the known parameters of the factors controlled during a survey, it is probable that if nothing matching the profile of the materials being sought was sighted, *it is because it was not there*. This seemingly counterintuitive ability to state with some certainty that a given area covered was empty of the items being sought gives significance to the cases in which such items were found.

Events vs. Processes

Many archaeologists and historians expend a disproportionate amount of effort in chronicling events – identifying, dating, and arranging them in sequential order. Nowhere is this more apparent than in shipwreck studies. Maritime archaeologists are fond of referring to shipwrecks as “time capsules,” by which they mean that the event of a vessel’s loss encompasses a moment in time that produces a unit of contemporaneity in the archaeological record. The assumption is that all objects aboard the ship at the moment of its loss were deposited at the same time. Such moments in time offer opportunities for archaeological inference that are relatively rare and much sought after on land. The site of Pompeii is probably the best-known instance, and archaeologists sometimes refer to assumed units of contemporaneity preserved in the archaeological record as examples of the “Pompeii premise.” Of course, Pompeii’s fame arises largely from its uniqueness and the relative rarity of such occurrences on land. In general, the best opportunities for building inferences based on this assumption in land archaeology come from undisturbed tombs and burials.

More commonly, land archaeologists encounter stratified deposits which reflect varying degrees of mixing and alteration of materials due to the operation of postdepositional factors including later reoccupation or reuse of the site. Much of contemporary archaeological theory is aimed at recognizing and controlling for these postdepositional factors. Archaeologists who address this problem soon realize that what seem to be events in the archaeological record are actually processes that operate over time. However eager archaeologists may be to arrive at conclusions about past human behavior, they cannot expect these conclusions to be convincing unless they have first dealt effectively with the physical processes that affect the association, distribution, and condition of the materials that occur together in the ground or on the seabed.

For maritime archaeologists this problem is acute in areas where multiple shipwrecks occur. These localities were usually known hazards to navigation that either were unavoidable or offered advantages that made them attractive despite the risks. Such places included the rocky ledges of Yassi Ada off the Turkish coast, the reefs and shoals of Bermuda, the coral heads and sandy keys of the Dry Tortugas in Florida, and the turbulent waters of the capes along the east coast of North Carolina. It would be unwise

to assume that shipwrecks found in such areas represent simple, Pompeii-like events. What is more likely is that such areas abound in “ship smears” – that is, localities where wreckage and debris fields from different wrecks overlap and materials deposited from strandings (where the vessel escaped wrecking only after jettisoning heavy items such as guns, cargo, or ballast) further complicate the picture. Such situations more closely resemble stratified or disturbed sites on land and require the same attention to postdepositional factors.

If archaeological events derived from assumptions about Pompeii-like or “time-capsule” associations are illusory, so, too, are historical events such as the wrecking, scuttling, and even construction of ships. Upon close examination, these so-called events prove to be embedded in ongoing processes linked to social, economic, and even symbolic activities. The drama of a shipwreck focuses attention on the event, but the conditions that produced the wreck and the consequences arising from it are as significant as the event itself. Dramatic moments at sea tend to attract attention from archaeologists at the expense of the sociocultural processes leading to the ship’s loss or the effects of the loss on the sociocultural system to which the ship belonged.

Nothing illustrates this problem of how event-oriented studies can overlook the processes at work better than the case of the *Titanic*. It should be noted at the outset that no archaeology has been attempted so far on the wreck of the *Titanic*. The underwater photographs and videos produced by the oceanographer Robert Ballard and his colleagues, useful and dramatic as they are, are not maps or site plans; nor has there been any systematic attempt to record the site’s physical associations. The wreck of the *Titanic*, along with other deeply submerged shipwrecks, continues to present a technical challenge to such studies. The usual historical accounts of the wreck of the *Titanic* tell the now-familiar story, emphasizing the celebrities on board at the time and the drama of the surrounding events. More thoughtful accounts, such as that of Wyn Craig Wade (1986), examine the testimony given at the inquest that followed the sinking and raise questions about the behavior of the captain, who continued to steam at high speed at night through an area known to contain icebergs. Did the presence of senior White Star Line officials on board and the publicity surrounding the ship’s maiden voyage encourage such risk-taking? And what about the failure to equip the ship with enough lifeboats for all the

passengers? Was this deficiency a reflection of post-Victorian overconfidence in engineering, especially with regard to the ship's compartmentalization and its image as unsinkable? The inquest was an important part of the sociocultural processes surrounding the wreck involving institutional elements such as the government, insurers, and the press, as well as the surviving members of the crew and passengers. These are examples of the sorts of issues that need to be considered whenever shipwrecks are examined.

The Pitfalls of Presentism

It is tempting to view the past as leading to some conclusion known to us in the present. Philosophers of science caution against this kind of reasoning, which creates a false sense of the inevitability of the outcome and omits or ignores developments that did not lead to it. This *ex post facto* history is, in fact, another example of the fallacy of affirming the consequent, and underwater archaeology has been strongly influenced by it.

One variant of *ex post facto* history presents the past as a series of stages leading to a final result. This approach, sometimes called *unilineal cultural evolution*, can be traced to the late-nineteenth-century writings of scholars such as Lewis Henry Morgan and E. B. Tylor and the more recent work of the anthropologist Leslie White and his students. Another variant is the idea of *cultural diffusion*. At its most extreme, this theory considered human beings essentially un inventive and capable of producing cultural traits only once; the traits were then spread through culture contact like ripples in a pond. These evolutionist and diffusionist theories each had chronological implications. In the case of evolutionism, it was generally assumed that more complex cultural institutions and technologies inevitably followed earlier, simpler stages; the occurrence of so-called simple or primitive cultural institutions in recent times was considered a *survival*. For diffusionists, the spread of cultural traits from one society to another was envisioned as having produced sequential layers of institutions and technologies that provide a picture of the history of each society; traits instead of cultural stages were viewed as the survivals in this case. Neither theory has survived the tests provided by controlled archaeological research.

The principal lesson that underwater archaeologists can learn from these early anthropological gropings at theory is that the present can never be

safely used as a direct guide to the human past. Maritime historians and archaeologists continue to study the ship- and boat-building traditions of different cultures, often acquiring useful information but sometimes also perpetuating the notion that technologies observed in the present can be projected backward. The problem with this presentism is that it can blind us to past situations and behavior that have no extant counterpart.

Issues surrounding the initial arrival of human beings on the Australian continent illustrate this problem. Archaeological research in Australia and New Guinea has shown that the ancestors of the modern Australian Aborigines arrived over 30,000 years ago, with possible dates for prehistoric sites extending back as much as 55,000 years (Lourandos, 1997: 87–88). Although Australia, New Guinea, and Tasmania were connected until around 12,000 years ago, when world sea levels were much lower than they are today, no land bridge has existed between Southeast Asia and Australia for millions of years. Recent bathymetric data on changes in sea levels and consequent changes in land surfaces and shorelines in this region over the past 65,000 years (Butlin, 1993: 14–34) implies that the first migrants to Australia traveled out of sight of land in watercraft of some kind. Various alternative routes at different times have been considered (Birdsell, 1977; Butlin, 1993), with a strong argument in favor of early movement by sea from Timor to somewhere on Australia's northwest coast. No modern or historical Australian Aborigines have produced watercraft likely to have been capable of making a voyage of this kind. Experimental voyages and ethnohistory suggest that reed, bark, and log canoes similar to those of indigenous Aboriginal design were capable of voyages of 25 to 60 kilometers under ideal sea and weather conditions (Jones and Meehan, 1977; Rowland, 1995), but it remains to be seen if such canoes could account for this ancient migration. This conclusion is supported by a recent attempt at experimental voyaging from Timor to Australia (Bednarick, 1998).

Although preceded by shorter voyages within sight of land as far back as *Homo erectus* (*Science*, Vol. 279, 13 March 1998), the initial settlement of Australia reflects the earliest long-distance overwater voyage known. No direct evidence of it (such as canoe remains or likely arrival sites), however, has so far been found. We can assume that the watercraft that were used for this journey were not necessarily sophisticated in their design or construction, but they had to be sufficiently large and strong to

transport a viable colonizing population and then return to communicate their discovery. Nothing produced by the ethnographic and historic Aborigines definitively meets these requirements. This highlights the dangers of presentism and can serve as a caution against the temptation to extrapolate human behavior from the ethnographic present directly to the ancient past.

Intuition and Science

Unexpected connections between seemingly unrelated phenomena sometimes point the way to conclusions about archaeological findings. The maritime archaeologist George Bass offers as an example the case of the so-called ox-hide ingots of copper found as cargoes in Bronze Age shipwrecks. The received wisdom at the time was that these four-handled ingots were made in the shape of prepared ox-hides. During a visit to a foundry in Philadelphia, Bass saw copper being cast in open molds, and the surfaces exposed to air exhibited the same rough surface texture as the Bronze Age ingots. Moreover, the molds included protrusions to make the ingots easier to lift and transport. Bass concluded that the ox-hide shape of the ancient ingots was intended to facilitate lifting and carrying them, and later he found ancient Egyptian tomb paintings showing ingots of this shape being carried.

Serendipitous connections of this kind should not be ignored or discouraged, but not everyone is able to make them. However useful, intuition cannot serve as a guide to the conduct of research in underwater archaeology. One of the benefits of a scientific, analytical approach is that it provides a framework for evaluating archaeological findings apart from subjective, intuitive judgments. Intuition should always be tested by good archaeological science.

Subjective judgments often enter into the interpretation of patterns in the archaeological record, where it may be assumed that a particular pattern is unique to a specific culture-historical tradition. This is in fact one of the most difficult propositions to demonstrate when dealing with past human behavior. Patterning in the archaeological record may sometimes have more to do with the laws of physics than with any cultural construction. The mid-nineteenth-century addition to warships of structures projecting below the waterline at their bows (Fig. 2a-b) illustrates this



Fig 2a–b. Above- and below-water views of the ram bow on the wreck of *H.M.S. Vixen*, Bermuda.

problem. The original purpose of these structures was ramming opposing vessels during battles at sea, but their later examples were too lightly constructed to have served effectively as rams and were in fact attempts to lighten the ships' bows while under way. And, as Fred Walker, naval architect at the National Maritime Museum, Greenwich (U.K.), has pointed out (personal communication), mid- to late-twentieth-century commercial ship construction saw the widespread introduction of bulbous pointed bow extensions underwater that improved the efficiency and economy of ship movement. In short, it is possible that, on a purely trial-and-error basis, shipbuilders were realizing similar increases in efficiency as a by-product of the introduction of the ram bow. The widespread adoption of ram bows on warships during the second half of the nineteenth century may have had as much to do with these sorts of efficiencies as with a desire by the Admiralty to employ ramming tactics at sea. Before we attribute this innovation wholly to British naval tactical planning, we must be prepared to consider the more general possibility that ships built with this feature performed better with respect to speed, fuel economy, and structural integrity. The historically particular explanation in this case needs to be examined and tested against more general ones.

This cautionary review is not intended to discredit historical particularism as a general approach to archaeological materials. Not all underwater archaeologists will want to address broad social-scientific themes or to use statistically based analytical approaches to do so. But underwater archaeologists operating in a historical-particularist mode are obliged to take these kinds of critical considerations into account if they wish to see their conclusions about the human past taken seriously or widely accepted.

Materialism and Archaeological Interpretation

Archaeologists depend primarily for their inferences about past human behavior on material associations in the archaeological record. The materialist Marxist assumption that human behavior and history are structured primarily by the relations of production – that is, the technological and economic factors involved in the development of human institutions – coincides nicely with the remains found in the archaeological record. The biggest gaps in the record have to do with social and symbolic relations, which often either leave nothing behind or produce remains that are open

to a variety of subjective interpretations. Marx's materialism – expressed in his monumental *Capital* (1867) – viewed changes in technology and economy as prime movers in history and coincides with the archaeologist's reliance upon material remains of past human behavior that reflect such changes. Through the work of V. Gordon Childe, this materialism became a major component of archaeological theory. The rise of economic archaeology in Europe and its extension to Australia and North America resulted directly from his efforts and those of his students for over three decades. The New Archaeology of the 1960s and 1970s also had strongly Marxist roots. Underwater archaeology offers new opportunities to examine the materialist assumptions. One example of these opportunities is the archaeological record from the Dry Tortugas, a collection of tiny sandbars and reefs lying between Florida and Cuba that is a classic example of a ship trap. At least 241 ship casualties occurred there from prior to 1800 (and probably as early as the sixteenth century) until 1969 (Murphy, 1993a). This figure suggests that ships approaching or transiting the Dry Tortugas were taking unusual risks, and documents indicate that the risks were recognized. Anecdotal information about storms in this area has been accumulating since Columbus's first voyage, and much information has been gathered more recently about weather, currents, shoals, and other elements of the local geography. Lighthouses were introduced as early as 1825, revealing an early awareness of the navigational hazards. From documents such as the letters that passed between the Tift brothers of Key West on 25 February 1860 concerning the brig *Wabash*, we can begin to understand the nature of this risk taking. Tift and Company had contracted with the U.S. War Department for the transport of bricks manufactured in Pensacola to Fort Jefferson in the Dry Tortugas and Fort Taylor in Key West, and the *Wabash* was one of its ships. It had recently been condemned by its insurers, but in their correspondence the Tift brothers agreed to continue to operate it in the Straits of Florida without insurance.

Shipwrecks documented so far in the Dry Tortugas for the period from about 1830 to 1910 contain evidence of risk taking and cost cutting that a materialist Marxist might expect to see. The Tift correspondence applied only to ships transporting construction materials to Fort Jefferson and Fort Taylor, but even if we did not have these documents we could tell from the archaeological remains of these wrecks that they were being pushed

beyond their normal limits of use and were exposed to unusual hazards. They show physical signs of shortcuts in their operations and maintenance such as hull patches, deadeyes made of pinewood (an inferior material for this purpose but likely to be available during a voyage), and massive amounts of cement mastic to stop bilge leaks and fill in rotted or missing internal elements of the hull. The Dry Tortugas have proved to be a mother lode for the study of shipwrecks that can be used to test materialist-Marxist propositions about relationships between maritime technology and economy and the nature of commerce at sea during the late nineteenth century.

Stripped of the polemics that have sometimes accompanied attempts to discuss Marx as a social theorist, however, the materialist-Marxist view remains a useful explanatory approach, especially where capitalist economic relations are a dominant feature of historical traditions. This testing of the idea that material relations play a dominant role in human affairs has been one of the great, mainstream historical traditions of modern archaeology, and it is a process in which underwater archaeologists should participate.